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(54) **PALLET DEVICE WITH SUPPORT RIBS**

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(58) **Field of Classification Search**
USPC 108/51.3, 55.3, 56.1, 51.11, 57.18
See application file for complete search history.

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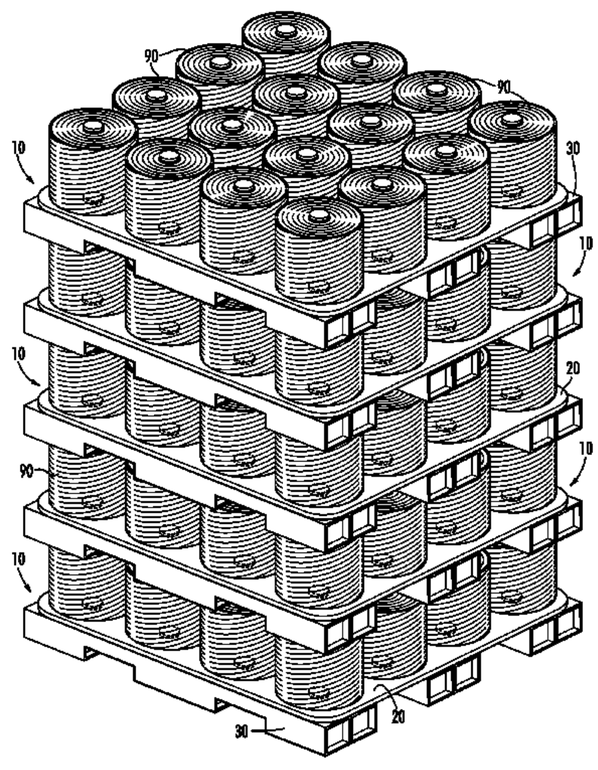
(57) **ABSTRACT**

A pallet device for storing and shipping goods is disclosed. The pallet device may include a planar surface having a top and a bottom. The pallet device further may include cross braces having two openings extending therethrough and separated by a partition. The partition includes a row of slits that each extend along the depth of the cross brace. The lower surface of the cross brace also may include a row of slits that each extend along the width of the cross brace. The cross brace is secured to the bottom of the planar surface. The pallet device also includes a plurality of ribs that are each inserted into a slit of the partition as well as a slit of the lower surface of the cross brace.

29 Claims, 7 Drawing Sheets



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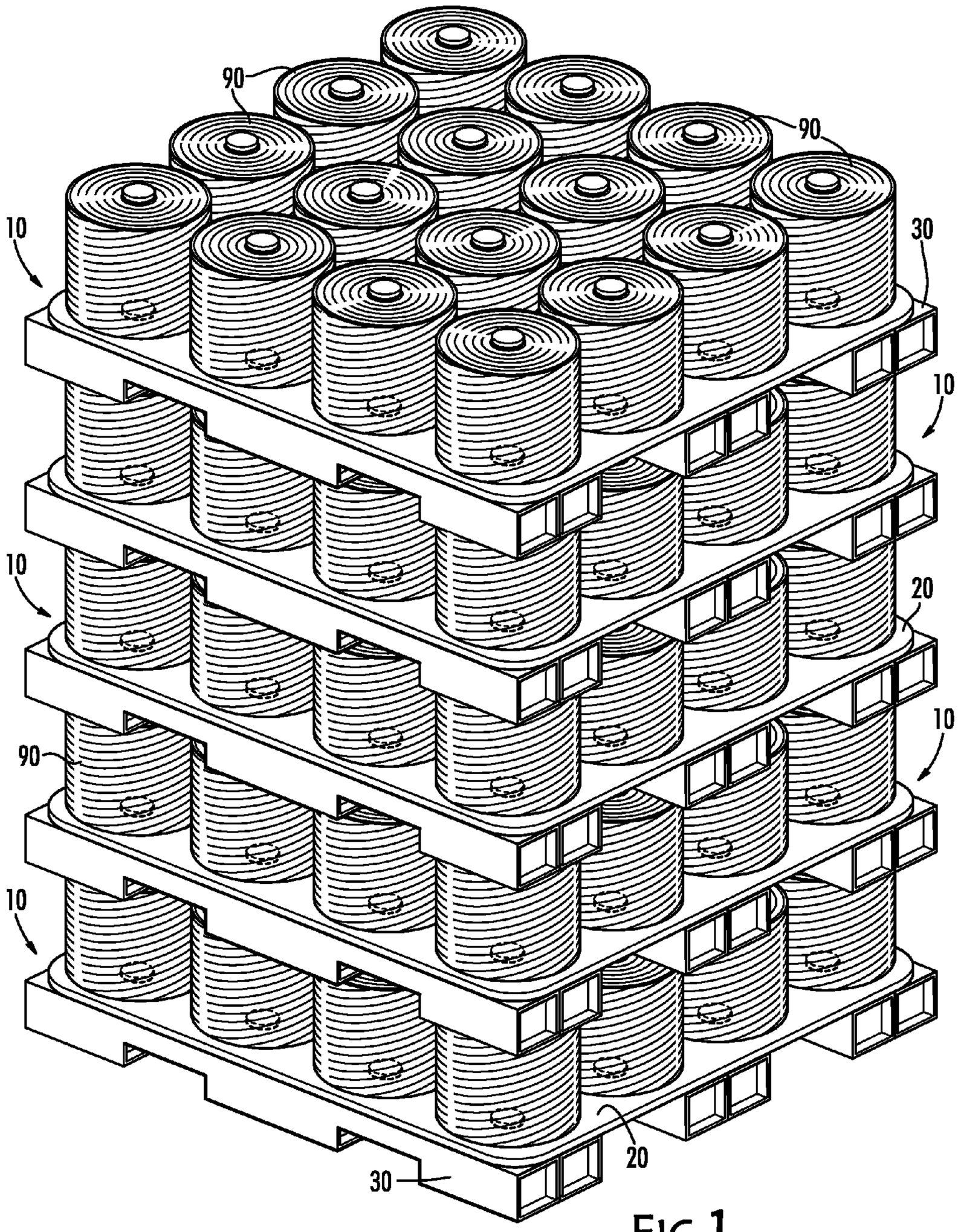


FIG. 1

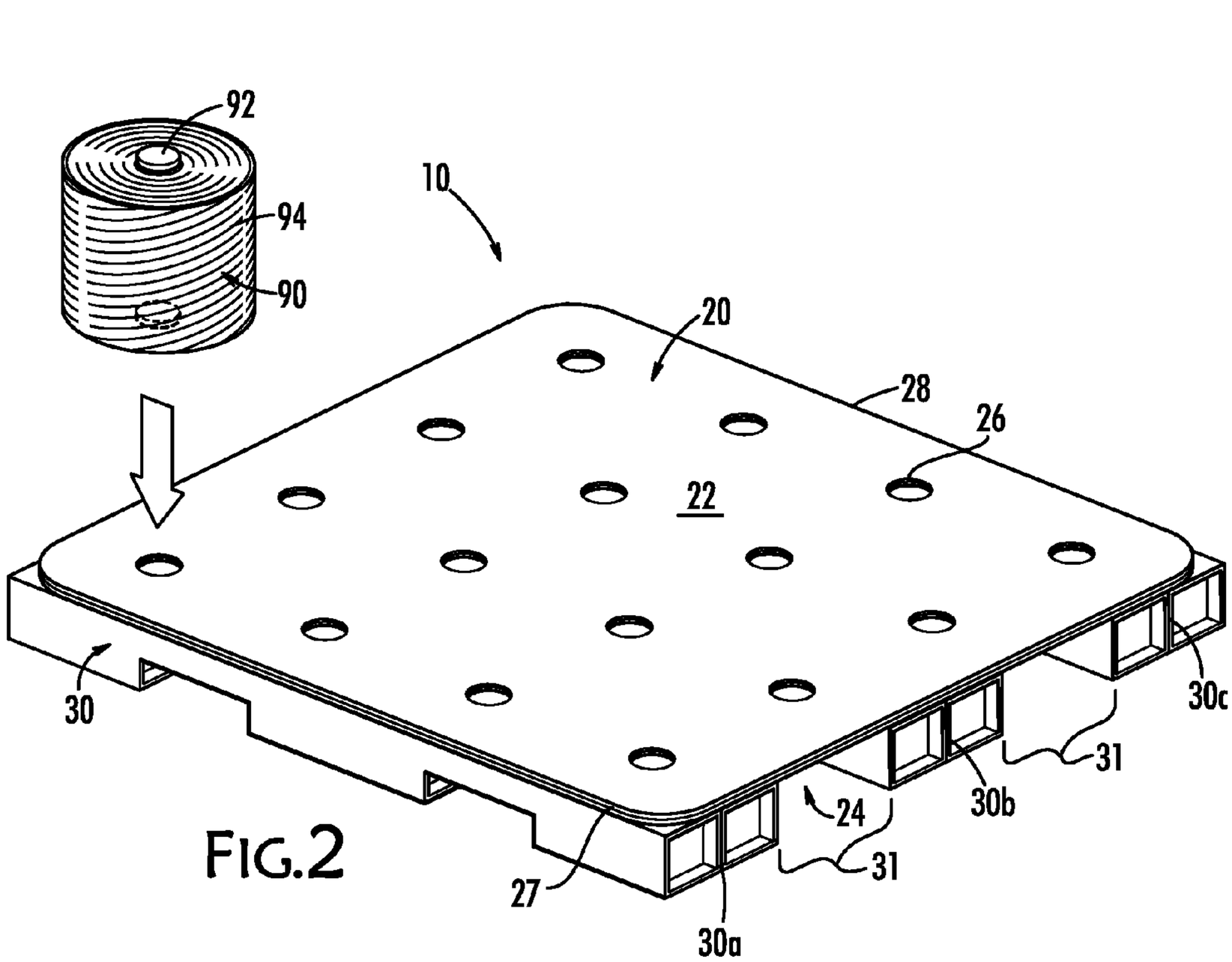


FIG.2

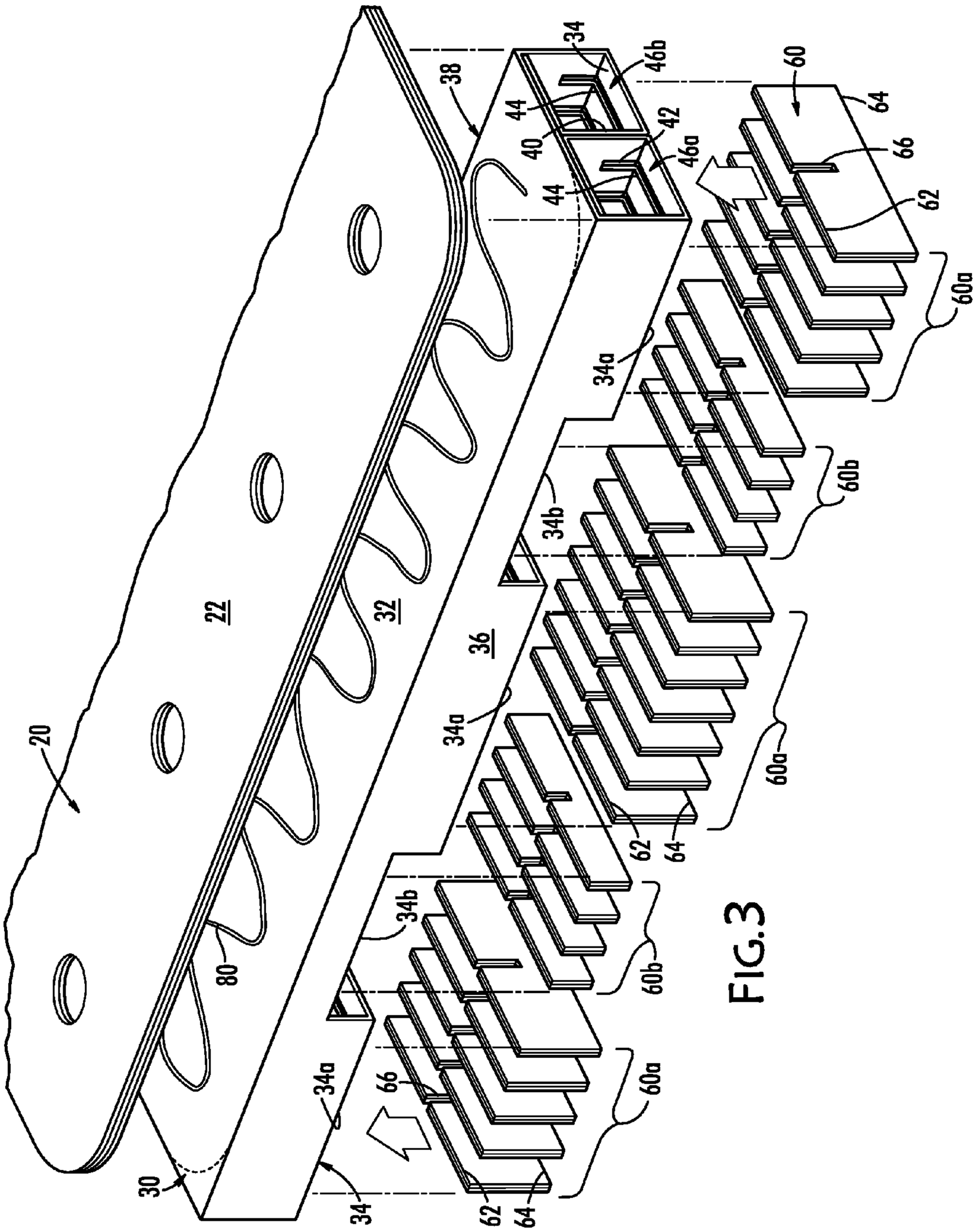
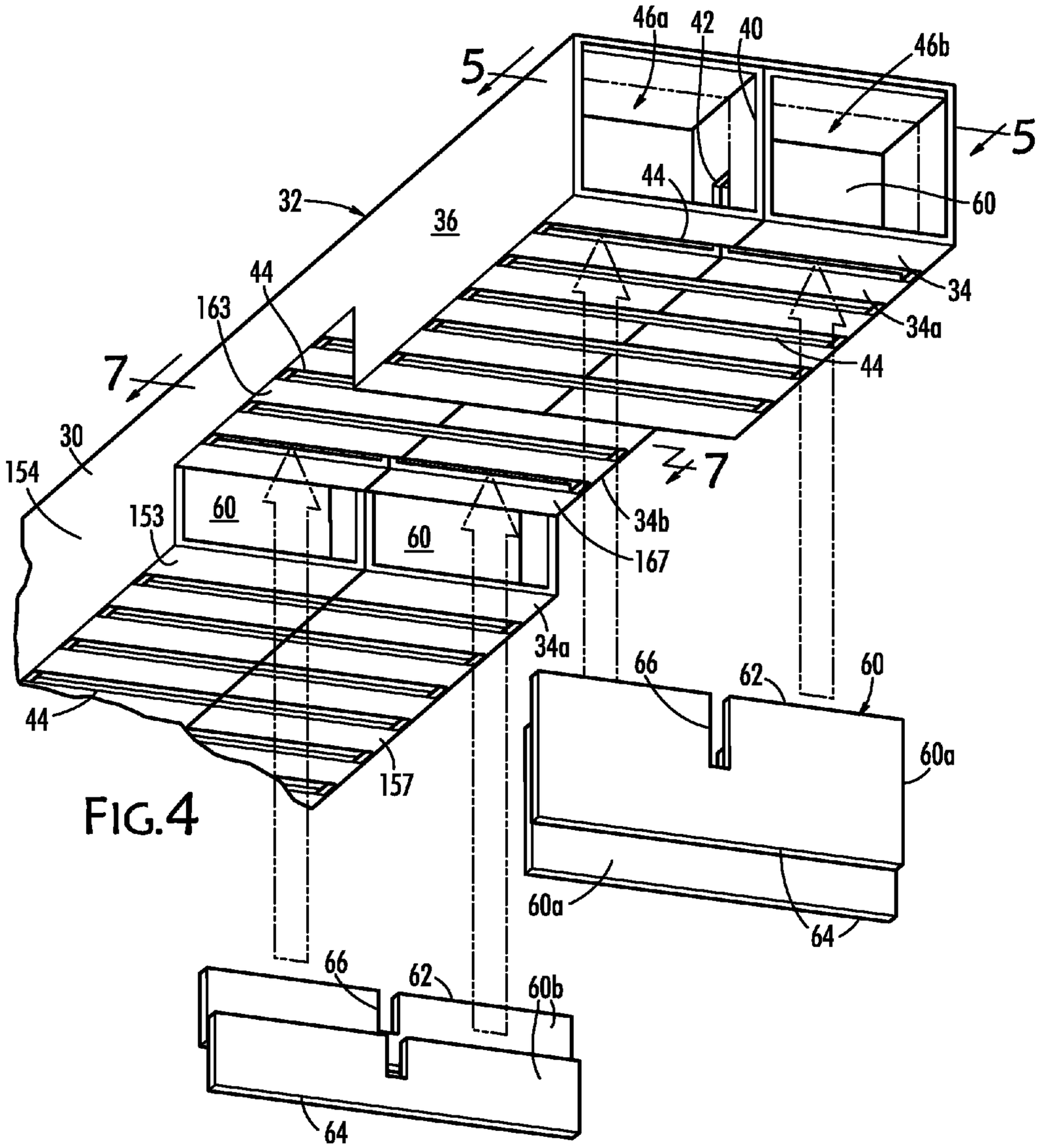


FIG.3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42
40
46b
5
5
32
36
44
163
7
7
30
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153
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60
34
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60a
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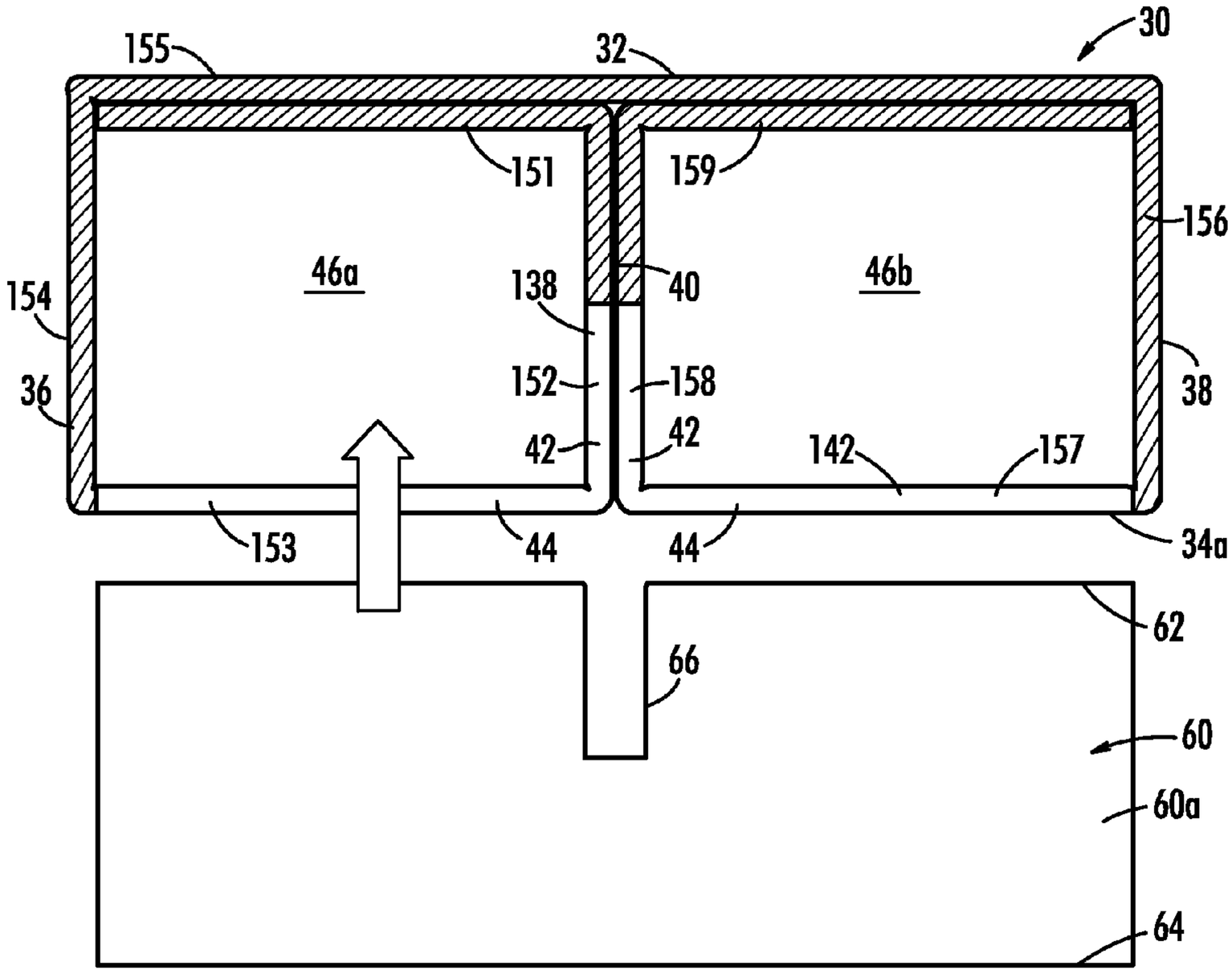
60b
64

FIG.4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32
30
151
159
156
46a
138
40
46b
154
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142
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66
60
60a
64

FIG.5

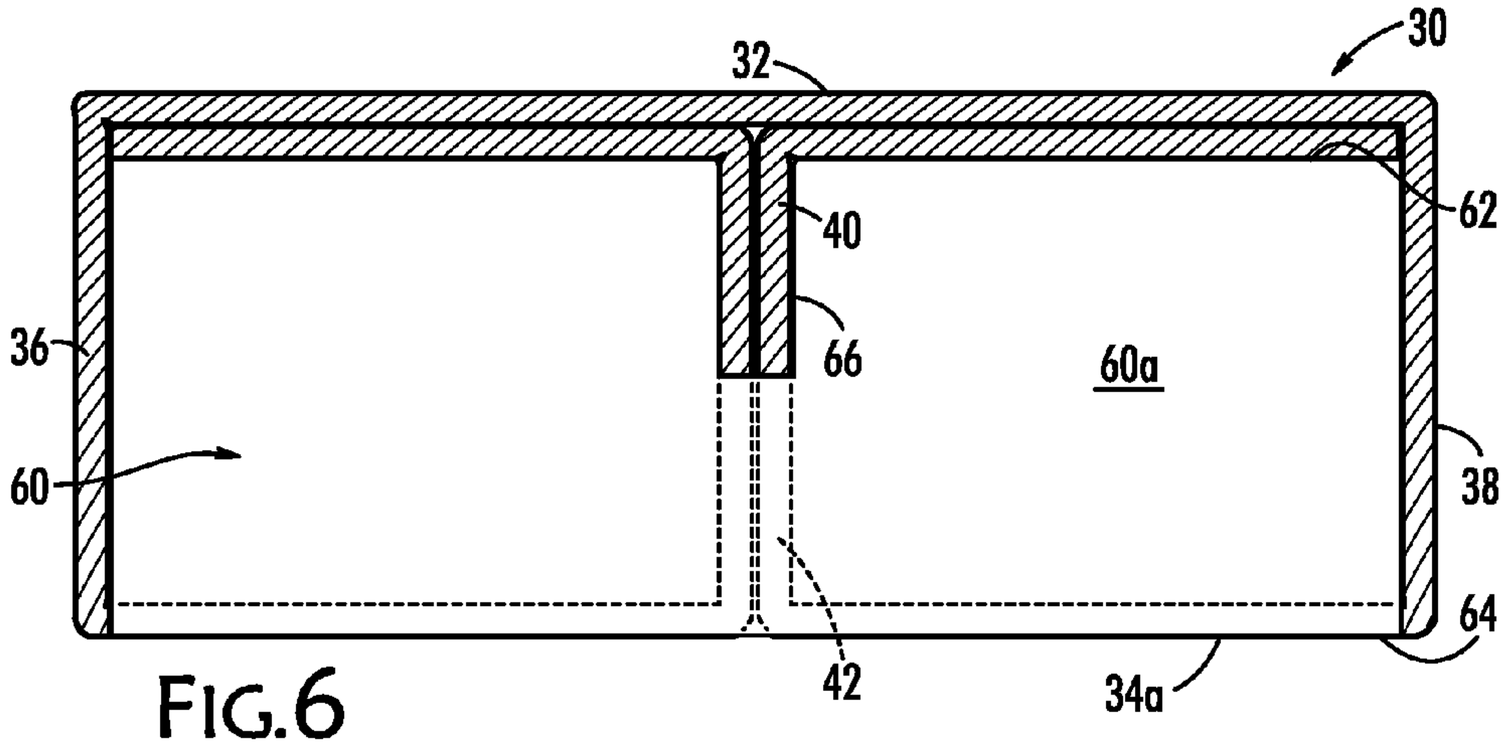
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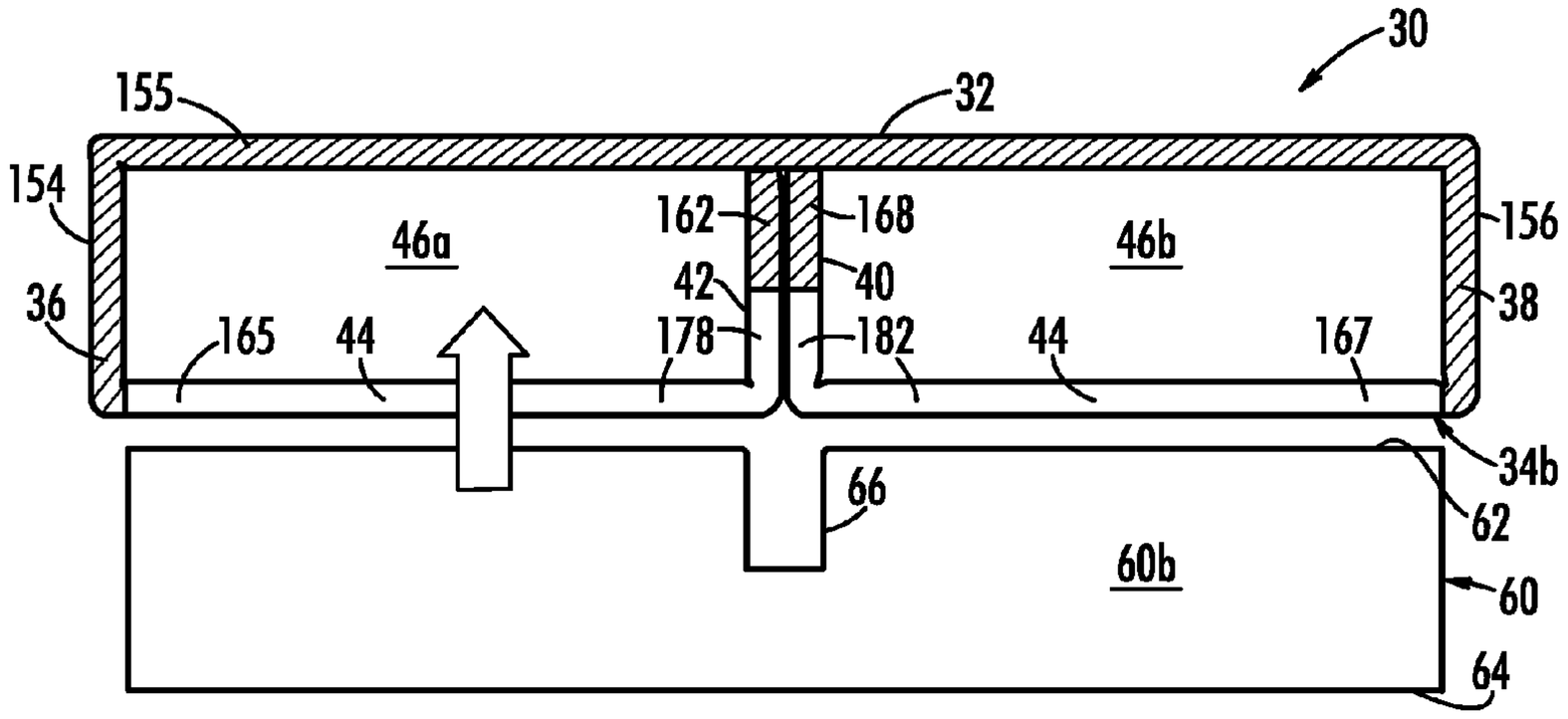
FIG.6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46a
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167
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34b
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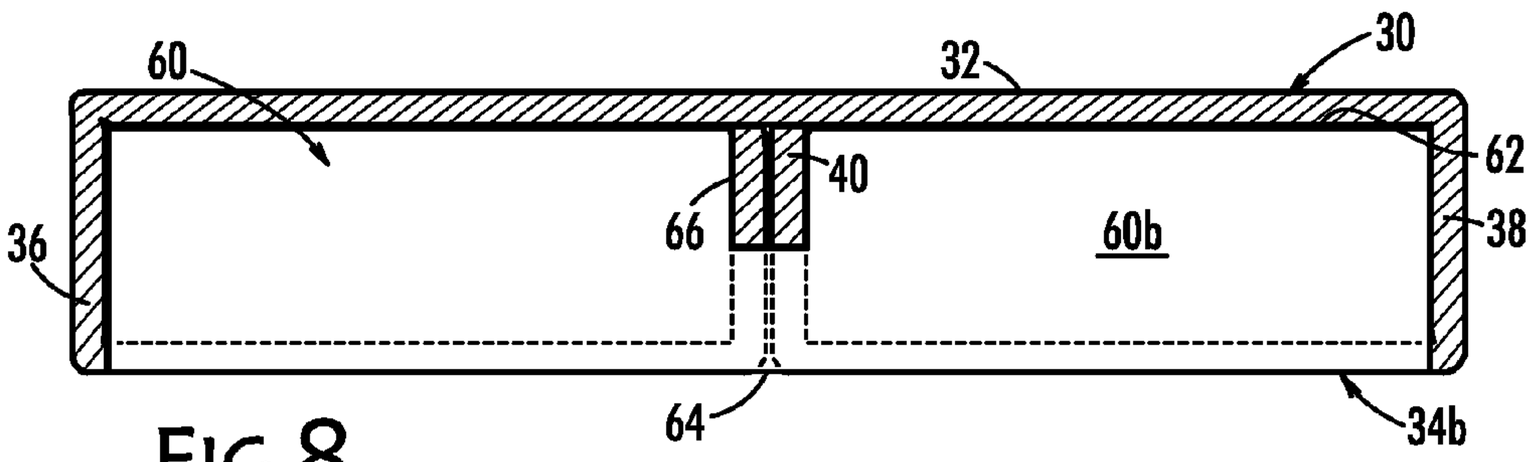
62
60b
60
64

FIG. 7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32
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60b
36
38
64
34b

FIG. 8

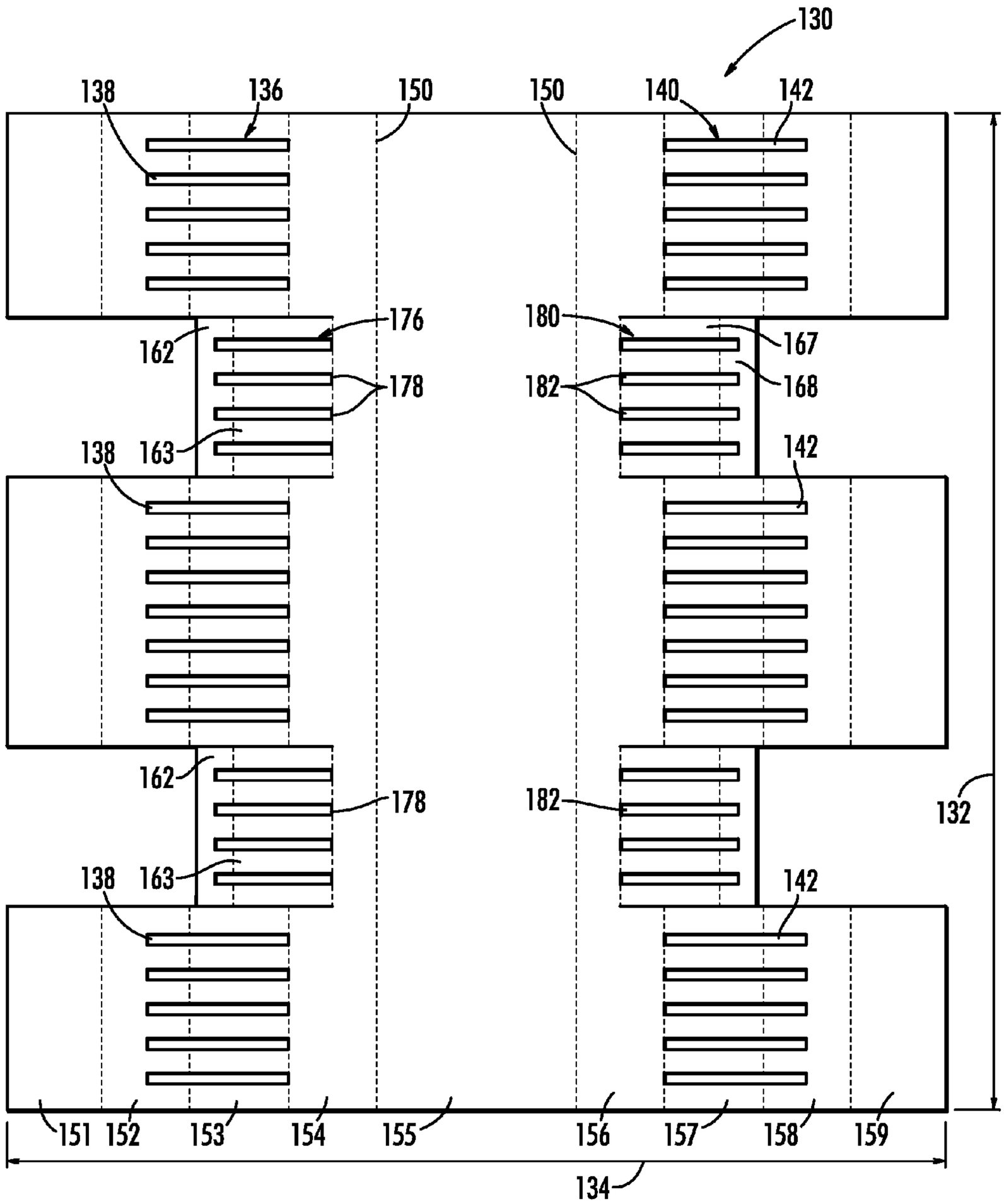
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FIG. 9

PALLET DEVICE WITH SUPPORT RIBS

BACKGROUND

The present invention relates generally to the field of pallets. More particularly, the present invention relates to pallets that securely store a load of goods typically for shipping and storage of such goods.

Pallets for use in storage and shipping are widely used in almost every industry that involves the transport of goods. Pallets vary in size, configuration, and material. For example, pallets composed of wood, metal, plastic, and paper are known.

Pallets composed of paper-type material, such as cardboard, are ideal for storage and shipping of goods in many industries because of the ability to break-down and then store the pallets as well as the ability to recycle the material after use. Furthermore, cardboard pallets typically weight significantly less than pallets made of other materials thereby substantially reducing shipping weights and costs. Pallets made of cardboard, however, are typically not as strong and durable as pallets made of other materials such as wood, metal, and plastic.

While various pallets are known, there is a need for a pallet composed of paper-type material that is strong and durable enough for use in shipping and storage of goods.

SUMMARY

The present invention includes a pallet device for storing goods. In one embodiment of the invention, the pallet device includes a planar surface having a top and a bottom. The pallet device further includes at least two foldable cross braces for securing to the bottom of the planar surface. The cross braces each have a length and a width as well as a first row of first slits extending along the length of the cross brace and a second row of second slits also extending along the length of the cross brace. The pallet device also includes a plurality of ribs. Each of the ribs is for insertion into a first slit of the first row of first slits and a second slit of the second row of second slits when the cross brace is folded.

In an alternative embodiment of the invention, the pallet device includes a planar surface having a top and a bottom. The pallet device further includes at least two cross braces each having a length, a width, and a depth. Each of the cross braces further have an upper surface, a lower surface, two sides, and a partition all extending along the length of the cross brace and forming two openings extending along the length of the cross brace. The openings are positioned adjacent to each other along the width of the cross brace and are separated by the partition. The partition includes a first row of first slits wherein each first slit extends along the depth of the cross brace. Further, the lower surface includes a second row of second slits wherein each second slit extends along the width of the cross brace. The upper surface of the cross brace is for securing to the bottom of the planar surface. The pallet device also includes a plurality of ribs. Each of the ribs is for insertion into a first slit of the first row of first slits and a second slit of the second row of second slits.

The present invention also includes a cross brace for use with a pallet device. In one embodiment of the invention, the cross brace includes an upper surface, a first lower surface, a second lower surface, two sides, and a partition all extending along an entire length of the cross brace and forming two openings extending along the length of the cross brace. The openings are positioned adjacent to each other along a width of the cross brace and are separated by the partition. The first lower surface is positioned at a first depth of the cross brace and the second lower surface is positioned at a second depth of the cross brace wherein the first depth is greater than the second depth. The partition includes a first row of first slits and the first and second lower surfaces includes a second row of second slits wherein each second slit extends along the width of the cross brace and is perpendicular to the first slits of the partition. Further, the cross brace includes at least three first lower surfaces along the length of the cross brace and at least two second lower surfaces along the length of the cross brace whereby the first and second lower surfaces alternate along the length of the cross brace.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of several stacked pallet devices according to an embodiment of the present invention with goods stored therebetween and thereon;

FIG. **2** is a perspective view of the pallet device according to an embodiment of the present invention and demonstrating how goods may be secured thereto;

FIG. **3** is an exploded perspective view of the pallet device according to an embodiment of the present invention showing how the pallet device may be secured together;

FIG. **4** is an exploded perspective view of the cross brace and ribs according to an embodiment of the present invention showing how the ribs may be inserted into the cross brace;

FIG. **5** is a front elevation view of the embodiment of the cross brace and rib taken at line **5**-**5** of FIG. **4** showing how the rib may be inserted into the cross brace;

FIG. **6** is a front elevation view of the embodiment of the cross brace and rib of FIG. **5** showing the rib inserted into the cross brace;

FIG. **7** is a front elevation view of the embodiment of the cross brace and rib taken at line **7**-**7** of FIG. **4** showing how the rib may be inserted into the cross brace;

FIG. **8** is a front elevation view of the embodiment of the cross brace and rib of FIG. **7** showing the rib inserted into the cross brace; and

FIG. **9** is a plan view of an embodiment of the cross brace prior to being formed.

DETAILED DESCRIPTION OF REPRESENTATIVE EMBODIMENTS

The present invention is related to a pallet device that is particularly suitable for storing and shipping goods. Although primarily described herein in terms of its use for storing and shipping goods, it will be clear that the present invention may be used for a variety of other purposes. The invention will be described with reference to the figures forming an integral non-limiting part of the instant specification. Throughout the description similar elements will be numbered accordingly.

FIG. **1** discloses an embodiment of the pallet device **10** of the present invention. Several pallet devices **10** are in a stacked arrangement with goods **90**, such as spindled material, positioned between and on the pallet devices **10**. It will be understood that several different types of goods may be used in connection with the pallet device **10** and such goods are not limited to goods that appear or are sized similar to goods **90**. Further, while the disclosed embodiment includes five stacked pallet devices with goods stacked therebetween and thereon, a single pallet device may be used for storing and shipping goods as well as more or fewer than five pallet devices. The number of pallet devices used typically depends on the types of goods loaded on the pallet device as well as the space available for storing and/or shipping the goods.

FIG. **2** discloses an embodiment of a pallet device **10**. In this embodiment, the pallet device **10** may include a planar surface **20** having a top **22** and a bottom **24**. The planar surface may include openings **26** for securing goods **90** to the pallet device **10**. Here, the goods **90** have a spindle type structure **92** running through the center of material **94**. The spindle type structure **92** extends beyond the material **94** so that an end of the spindle type structure **92** may be inserted into an opening **26** of the planar surface **20** of pallet device **10**. By inserting the spindle type structure **92** into the opening **26** of the planar surface, the goods **90** are securely positioned on pallet device **10**.

In the embodiment disclosed in FIG. **2**, the openings are circular. In an alternative embodiment, the openings are square or rectangular. It will be understood that several different shapes and configurations of openings may be used and the number of openings may vary. Furthermore, the planar surface may be constructed without openings and securing techniques other than openings may be used to secure goods to the pallet device. For examples, simply the weight of the goods may secure it to the pallet device. Further, straps may be used. In the disclosed embodiment the planar surface **20** is approximately square shaped with rounded corners. The shape of the planar surface however also may vary.

As shown in FIGS. **2** and **3**, the pallet device **10** may also include cross braces **30** secured to the bottom **24** of planar surface **20**. A number of securing techniques may be used to secure cross braces **30** to the bottom **24** of planar surface **20**. For example, as shown in FIG. **3**, adhesive material **80**, such as heavy duty glue, may be incorporated between the cross brace **30** and the bottom of planar surface **20** to secure them together. In the embodiment disclosed in FIGS. **1** and **2**, each pallet device **10** includes three cross braces **30**; however, the number of cross braces incorporated into a pallet device may vary. In these embodiments, the cross braces are secured transversely across the bottom **24** of the planar surface **20** in parallel relationship with space or gaps **31** between each cross brace **30**. For example, a first cross brace **30***a* is positioned at a first end **27** of the planar surface, a second cross brace **30***c* is positioned at a second opposing end **28** of the planar surface, and a third cross brace **30***b* is positioned along a middle centerline of the planar surface **20** so that it is approximately equidistant from the other two cross braces **30***a* and **30***c* .When a pallet device includes more or less than three cross braces, a different arrangement may be used. For example, when only two cross braces are used, both cross braces may be positioned at or near the ends **27**, **28** of planar surface **20** with no cross braces extending down the centerline of planar surface **20**. Further, when four cross braces are used, two cross braces may be positioned each at or near the ends **27**, **28** of planar surface **20** and the remaining two cross braces may be positioned equidistant between the cross braces positioned on the ends of planar surface **20**. When three or more cross braces are used, it is preferred that the cross braces are equally spaced along planar surface **20** however such equal spacing is not necessary. Further, in the disclosed embodiment, each cross brace **30** is approximately identically dimensioned and each cross brace **30** extends approximately the entire length of planar surface **20**. The dimensions of each cross brace used in a pallet device **10** of the present invention may vary and may only partially extend along the planar surface **20** or extend beyond the planar surface **20**. Moreover, several cross braces may be combined to extend a determined length of the planar surface **20**, which may be particularly useful when shipping or storing very large objects.

As shown in FIGS. **3** and **4**, the cross brace **30** of the pallet device **10** has a length, a width, and a depth. Furthermore, the embodiment of the cross brace **30** disclosed in FIGS. **3** and **4** has an upper surface **32**, a lower surface **34**, a first side **36**, a second opposing side **38**, and a partition **40** that all extend along the length of the cross brace **30**. The upper surface **32** of the cross brace **30** may be secured to the bottom of the planar surface **20** as shown in FIG. **3** and discussed above. The upper surface **32**, lower surface **34**, two sides **36**, **38**, and partition **40** all form two openings **46***a*, **46***b* that are separated by partition **40** and positioned adjacent to each other in side-by-side relation along the width of the cross brace **30**. Further, the two openings **46***a*, **46***b* also both extend along the length of the cross brace **30**.

The partition **40** may include a row of slits **42**. The row of slits **42** of partition **40** preferably extends along the length of the cross brace **30** and each slit preferably extends along the depth of the partition **40** from the lower surface **34** towards the upper surface **32**. In the disclosed embodiment, the slits **42** of partition **40** only extend approximately half the depth of cross brace **30** and therefore do not extend all the way to upper surface **32**. In an alternative embodiment, the slits of partition **40** extend approximately three-quarters of the depth of cross brace **30**, and, in yet another embodiment, the slits of partition **40** extend approximately one-quarter of the depth of cross brace **30**.

Further, the lower surface **34** may also include a row of slits **44**. The row of slits **44** of lower surface **34** preferably extends along the length of the cross brace **30** and each slit preferably extends along the width of the cross brace between the two sides **36** and **38**. The slits **44** of the lower surface **34** may extend entirely across the lower surface **34** and width of cross brace **30** or the slits may only extend partially across the lower surface **34** and width of cross brace **30**. Because the slits **42** of the partition extend along the depth of the cross brace **30** and the slits **44** of the lower surface extend along the width of the cross brace **30**, slits **42** are perpendicular to slits **44**.

As shown in FIGS. **3**, the pallet device may include ribs **60**. The ribs **60** provide additional structural integrity and support to the pallet device. Ribs **60** may be inserted into the pallet device **30** through slits **44** of the lower surface **34** and slits **42** of the partition **40**. Ribs **60** therefore preferably have a width of less than or equal to the width of slits **44** of lower surface **34**. Ribs **60** may extend the entire width of cross brace **30** or only partially across the width of cross brace **30**. In the disclosed embodiment, ribs **60** are rectangular in shape having an upper surface **62** and a lower surface **64**. Ribs **60**, however, may be shapes other than rectangular and/or each have varying shapes. For example, in one embodiment, the ribs **60** are trapezoidal in shape. Further, as more further discussed below, the ribs **60** may vary in size and dimension.

Ribs **60** may include one or more slots **66**. In the embodiment of FIG. **3**, only one slot **66** is shown that is positioned along the centerline width of rib **60**. Slot **66** however may be positioned in other locations along the width of rib **60**, particularly if more than one slot is included on a rib. Further, slot **66** preferably only extends partially from the upper surface **62** of rib **60** towards but not all the way to the lower surface **64** of rib **60**. In the embodiment disclosed in FIG. **3**, slot **66** extends from the upper surface **62** of rib **60** to approximately halfway between the upper surface **62** and lower surface **64**. The slot **66** of rib **60** is preferably positioned and configured to be in line with the slits **42** of the partition **40** of the cross brace **30**.

The number, location, and configuration of slot **66** may depend upon the slits **42** of the partition and slits **44** of the lower surface of cross brace **30**. For example, to provide the most structural integrity when inserted into cross brace **30**, the ribs **60** may extend from the upper surface **32** all the way to the lower surface **34** of cross brace **30** so that opening **46** is

entirely blocked by rib **60**. To do this in an embodiment such as discussed in FIG. **4**, the slot **66** of rib **60** must have a depth from the upper surface **62** of rib **60** that is at least as deep as the distance between the top of slit **42** of partition **40** all the way to the upper surface **32** of cross brace **30**. Further, the distance between the bottom of the slot **66** and the lower surface **64** of rib **60** must be as deep as slit **42** of partition **40**. FIGS. **5** through **8** disclose a rib **60** with a slot **66** that is sized to extend from the upper surface **32** all the way to the lower surface **34** of cross brace **30**. In some embodiments, however, ribs **60** and slot **66** may be sized to extend only partially between upper surface **32** and lower surface **34** of cross brace **30**. Further, rib **60** may be sized to only partially extend between sides **36** and **38** of cross brace **30**.

As shown in the embodiments of the pallet device of FIGS. **1** through **4**, the cross brace may include a portion with a full depth and a portion with a more shallow depth. Thus, the pallet device may have a first lower surface portion **34***a* positioned at the full depth and a second lower portion **34***b* positioned at the more shallow depth. In the embodiment disclosed in FIG. **3**, the more shallow depth is approximately half of the full depth. Further, in the illustrated embodiment, the cross brace **30** includes three first lower surface portions **34***a* and two second lower surface portions **34***b* that alternate along the length of the cross brace **30**. The depths, however, may vary and the number of depths and lower surface portions may also vary. For example, the cross brace **30** may include four distinct depths extending along the length of cross brace **30**.

When the depths vary such as shown in the embodiment of FIGS. **3** and **4**, the depths of the ribs **60** may also vary accordingly. For example, FIG. **4** discloses a first set of ribs **60***a* for insertion into the lower surface portion **34***a* having a first depth of cross brace **30** and a second set of ribs **60***b* for insertion into the other lower surface portion **34***b* having a second more shallow depth of cross brace **30**. Since the second more shallow depth is approximately half the depth of the first depth of cross brace **30**, the ribs **60***b* may also be approximately half the depth of the ribs **60***a*. The ribs **60***a*, **60***b* may be inserted into the slits of the lower surfaces **34***a*, **34***b* of cross brace **30**, respectively, as shown by the arrows.

FIGS. **5** and **6** further discloses the positioning and inserting of rib **60***a* into a slit **44**, **42** of lower surface **34***a* and partition **40**, respectively. FIGS. **5** and **6** are cross sections of the embodiment of the cross brace **30** of FIG. **4** taken along line **5-5**. FIG. **5** shows the cross brace **30** prior to insertion of rib **60***a* with rib **60***a* positioned below lower surface portion **34***a*. The rib **60***a* is inserted in the direction of the arrow of FIG. **5** into the slits **44**, **42** of lower surface **34***a* and partition **40**, respectively. FIG. **6** shows the rib **60***a* fully inserted into the cross brace **30**. As discussed above, this embodiment discloses the ribs **60***a* covering the entire openings **46***a*, **46***b* formed by the cross brace sides, surfaces, and partition **32**, **34**, **36**, **38**, and **40**. In some embodiments, the ribs **60***a*, however, may not cover the entire openings **46***a*, **46***b*.

FIGS. **7** and **8** discloses the positioning and inserting of rib **60***b* into a slit **44**, **42** of lower surface **34***b* and partition **40**, respectively. FIGS. **7** and **8** are cross sections of the embodiment of the cross brace **30** of FIG. **4** taken along line **7-7**. FIG. **7** shows the cross brace **30** prior to insertion of rib **60***b* with rib **60***b* positioned below lower surface portion **34***b*. The rib **60***b* is inserted in the direction of the arrow of FIG. **7** into the slits **44**, **42** of lower surface **34***b* and partition **40**, respectively. FIG. **8** shows the rib **60***b* fully inserted into the cross brace **30**. As discussed above, this embodiment discloses the rib **60***b* covering the entire openings **46***a*, **46***b* formed by the cross brace sides, surfaces, and partition **32**, **34**, **36**, **38**, and **40**. In some embodiments, the ribs **60***b*, however, may not cover the entire openings **46***a*, **46***b*.

FIG. **9** discloses an embodiment of a foldable cross brace **130** prior to folding. The embodiment of the cross brace of FIG. **9** may be formed of a paper-like foldable material such as a lightweight corrugated cardboard. Other foldable materials, however, may be used without departing from the scope of the invention. The prefolded cross brace **130** may have a length **132** and a width **134**. Further, the prefolded cross brace **130** may include a first row **136** of slits **138** extending along the length of the prefolded cross brace **130** and a second row **140** of slits **142** also extending along the length of the prefolded cross brace **130**.

Further, the prefolded cross brace **130** may include die cuts **150** extending along its length. In the embodiment of FIG. **9**, the die cuts **150** separate nine sections of the cross brace identified as **151**, **152**, **153**, **154**, **155**, **156**, **157**, **158**, and **159**. The cross brace may be formed by folding along the die cuts **150** to form a cross brace **30** such as shown in FIGS. **4** that includes an upper surface **32**, a lower surface **34**, two sides **36** and **38**, and a partition **40** all extending along an entire length of the cross brace **36** and forming two openings **46***a* and **46***b* also extending along the length of the cross brace **30**. The openings **46***a* and **46***b* may be positioned adjacent to each other along the width of the cross brace **30** and separated by the partition **40**.

FIGS. **4**, **5**, and **7** disclose an example of a cross brace **30** formed by folding cross brace **130**. Section **155** is the center section and forms upper surface **32**. Section **154** may be folded downward so that it is perpendicular to center section **155** and forms a first side wall **36**. Section **153** may then be folded inward so that it is perpendicular to section **154** and parallel to center section **155** but in a separate plane below center section **155**. Section **153** thereby forms a lower surface **34**. Section **152** may next be folded so that it is parallel to section **154** but in a separate plane and runs in between and perpendicular to sections **155** and **153**. Section **152** thereby forms a center partition **40**. Finally, section **151** may be folded inward to position it directly adjacent and parallel to center section **155**. Section **151** thereby forms an inner wall of upper surface **32** and section **155** forms an outer wall of upper surface **32**.

The opposing sections **156**, **157**, **158**, and **159** may then or simultaneously be folded similar to sections **151**, **152**, **153**, and **154**. For example, section **156** may be folded downward so that it is perpendicular to center section **155** and forms a second side wall **38** running parallel to first side wall **36** and partition **40**. Section **157** may then be folded inward again so that it is perpendicular to section **156** and parallel to center section **155** and preferably in the same plane as section **153**. Section **157** thereby also forms lower surface **34**. Section **158** may next be folded so that it is parallel to sections **154** and **156** and preferably directly adjacent and parallel to section **152**. Section **158** therefore forms center partition **40** with section **152**. Finally, section **159** is folded inward and is positioned adjacent and parallel to center section **155**. Section **159** thereby forms an inner wall of upper surface **32** similar to and preferably in the same plane with section **151**.

Moreover, in the embodiment disclosed in FIG. **9**, the first row of slits **136** extend partially across section **152** and completely across section **153**. As shown in FIG. **5**, when cross brace **130** is folded, slits **138** of the first row of slits **136** form an "L" shape entirely across the lower surface **34** and partially upward into partition **40**. Likewise, the second row of slits **140** extend partially across section **158** and completely across section **157**. When cross brace **130** is folded, slits **142** of the

second row of slits **140** also form an "L" shape entirely across the lower surface **34** and partially upward into partition **40**. Thus, the combination of slits **138** and **142** in sections **153** and **157**, respectively, of prefolded cross brace **130** combine to create slits **44** across the lower surface **34** of the folded cross brace **30**. Further, the combination of slits **138** and **142** in sections **152** and **158**, respectively, of prefolded cross brace **130** combine to create slits **42** in the partition **40** of the folded cross brace **30**.

The embodiment of the prefolded cross brace of FIG. **9**, may be folded to form multiple lower surfaces **34**. For example, the disclosed embodiment folds to form three first lower surface portions **34***a* along the length of the cross brace and two alternating second lower surface portions **34***b* along the length of the cross brace such as shown in FIG. **3**. To provide multiple depths, the prefolded cross brace **130** may include additional sections **162** and **163** carrying a third row **176** of slits **178** extending along the length of the prefolded cross brace **130**. In the disclosed embodiment, the slits **178** of the third row of slits **176** have a width smaller than the slits **138** of the first row of slits **136** and are positioned inward in relation to the first row of slits **136**. The third row of slits **176** may alternate between portions of the first row of slits **136**. In the embodiment of FIG. **9**, section **162** is approximately one-third to one-half the width of section **152** and is positioned in line with a portion of section **153**. Further, section **163** is approximately the width of section **153** with a portion extending under a portion of section **153** and another portion extending under a portion of section **154**. When prefolded cross brace **130** is folded, section **163** is folded inward similar to section **153** but is in a plane above section **153** so that two lower surfaces are formed having a first depth and a second depth as shown in FIGS. **3** and **4**. For example, section **163** may be folded to form lower surface **34***b* and section **153** may be folded to form lower surface **34***a* wherein the depth from lower surface **34***b* to upper surface **32** is approximately half the depth from lower surface **34***a* to upper surface **32**. In the embodiment disclosed in FIG. **4**, the slits of the lower surface **34***b*, however, are the same width as the slits of the lower surface **34***a* because section **153** and **163** are approximately the same width. Section **162** may be folded upward similar to section **152** and forms the partition **40** rising upward from lower surface **34***b*. In the embodiment disclosed in FIG. **4**, and more clearly shown in FIG. **7**, the slit **42** in folded cross brace **30** is more shallow from lower surface **34***b* because the slit **178** in section **162** is more narrow in width than the slit **138** in section **152**.

To provide multiple depths, the prefolded cross brace **130** may also include additional sections **167** and **168** carrying a fourth row **180** of slits **182** extending along the length of the prefolded cross brace **130**. In the disclosed embodiment, the slits **182** of the fourth row of slits **180** have a width smaller than the slits **142** of the second row of slits **140** and are positioned inward in relation to the second row of slits **140**. The fourth row of slits **180** may alternate between portions of the second row of slits **140**. In the embodiment of FIG. **9**, section **168** is approximately one-third to one-half the width of section **158** and is positioned in line with a portion of section **157**. Further, section **167** is approximately the width of section **157** with a portion extending under a portion of section **157** and another portion extending under a portion of section **156**. When prefolded cross brace **130** is folded, section **167** is folded inward similar to section **157** but is in a plane above section **157** so that two lower surfaces are formed having a first depth and a second depth as shown in FIGS. **3** and **4** and similar to the first and second depths formed by sections **153** and **163**, respectively. For example, section **167** may be folded to form a further portion of lower surface **34***b* and section **157** may be folded to form a further portion of lower surface **34***a* wherein the depth from lower surface **34***b* to upper surface **32** is approximately half the depth from lower surface **34***a* to upper surface **32**. In the embodiment disclosed in FIG. **4**, the slits of the lower surface **34***b*, however, are the same width as the slits of the lower surface **34***a* because section **157** and **167** are approximately the same width. Section **168** may be folded upward similar to section **158** and forms another portion of the partition **40** rising upward from lower surface **34***b*. In the embodiment disclosed in FIG. **4**, and more clearly shown in FIG. **7**, the slit **42** in folded cross brace **30** is more shallow from lower surface **34***b* because the slit **182** in section **168** is more narrow in width than the slit **142** in section **158**.

As shown in the embodiment of the prefolded cross brace **130** of FIG. **9**, the slits **138** of the first row of slits **136** may be in-line along the width **134** of the prefolded cross brace **130** with the slits **142** of the second row of slits **140**. Similarly, the slits **178** of the third row of slits **176** may be in-line along the width **134** of the prefolded cross brace **130** with the slits **182** of the fourth row of slits **180**. Further, the distance between the first and second rows of slits **136** and **140**, respectively, along the width **134** of the prefolded cross brace **130** may be greater than the distance between the third and fourth rows of slits **176** and **180**, respectively, along the width **134** of the prefolded cross brace **130**.

Once the prefolded cross brace **130** is folded, ribs **60**, including ribs **60***a* and/or **60***b* may be inserted into the cross brace as discussed above. Thus, referring to the slits of the prefolded cross brace **130**, each of the ribs **60** may be inserted into a slit **138** of the first row of slits **136** as well as a slit **142** of the second row of slits **140** when the cross brace **130** is folded. Further, if two depths are included, each of the ribs **60***a* may be inserted into a slit **138** of the first row of slits **136** as well as a slit **142** of the second row of slits **140** and each of the ribs **60***b* may be inserted into a slit **178** of the third row of slits **176** as well as a slit **182** of the fourth row of slits **180** when the cross brace **130** is folded.

The pallet device **10** may be composed of several different materials without departing from the scope of the invention. For example, the pallet device or portions thereof may be composed of paper products such as corrugated cardboard. Such an embodiment is beneficial because it may be light weight and recyclable after use. In an alternative embodiment, the pallet device or portions thereof may be composed of composite materials. The pallet device may be assembled from two stamping. The size of each stamping may change with the size of the pallet. For example, the pallets may range from full, half, and quarter-pallet sizes, based on a common 47"×47" standard. In some circumstances, industry standard single wall (double face) corrugated board may be used although double wall and tri-wall board may also be used and suitable for heavier use.

The type and amount of adhesive or securing means between the planar surface **20** and the cross brace **30** depend upon the material of such portions of the pallet device as well as the intended use of the pallet device. For example, when paper type material is used to construct the pallet device for maritime transport, wet strength paper type material and water-resistant glue or other securing techniques may be used to secure planar surface **20** and cross brace **30**. In one embodiment, glue guns, rollers, and/or brushes may be used to apply adhesive between planar surface **20** and cross brace **30**. Further, in one embodiment, no adhesive is used to secure ribs **60**

in cross brace **30**. In an alternative embodiment, adhesive is used to strengthen the connection between ribs **60** and cross brace **30**.

The pallet device **10** may be used with a fork lift or pallet truck. For example the tines of a fork lift or pallet truck may be inserted into openings **46**. Alternatively, when three cross braces are used in a pallet device, such as shown in FIGS. **1** and **2**, two spaces **31** may be formed across the pallet device between the cross braces. The tines of the fork lift or pallet truck may be inserted into these spaces **31**. Further, when two depths are used in a cross brace, the tines of the fork lift may be inserted below the second lower surface **34***b*, thereby making the pallet device accessible by a fork lift or pallet truck on all sides. Where the fork lift tines are inserted may also depend upon the size of the load and the need for extra support. When a fork lift picks up a pallet device, multiple pallet devices may be stacked with or without goods for storing and/or shipping.

The pallet devices may be printed with a bar code or an RFID may be used to assist in tracking the pallets or goods thereon in a plant, warehouse, or loading dock.

For recycling, the pallets may be crushed, shredded or otherwise modified for ease of shipment to a recycling plant.

It should be noted that there are several configurations suitable for the design of pallet device **10** and components thereof. Further, the number of cross braces, ribs, slits, openings, pallet devices, and other features and components discussed above and shown in the drawings are for example only and represent but some of the configurations. Other configurations altering the number and positions of such devices and components could be employed to demonstrate the invention. All configurations known in the art are intended to be encompassed by the present invention and the description and drawings shouadhnot be deemed to narrow the scope of the present invention in any way.

While various embodiments of the present invention have been described above, it should be understood that they have been presented by way of example, and not limitation. It will be apparent to persons skilled in the relevant art(s) that various changes in form and detail can be made therein without departing from the spirit and scope of the present invention. In fact, after reading the above description, it will be apparent to one skilled in the relevant art(s) how to implement the invention in alternative embodiments. Thus, the present invention should not be limited by any of the above described exemplary embodiments.

In addition, it should be understood that the figures, which highlight the functionality and advantages of the present invention, are presented for purposes of example only. The architecture of the present invention is sufficiently flexible and configurable, such that it may be used in ways other than that shown in the accompanying figures.

Further, the purpose of the Abstract of the Disclosure is to enable the U.S. Patent and Trademark Office and the public generally, and especially the scientists, engineers, and practitioners in the art who are not familiar with patent or legal terms or phraseology, to determine quickly from a cursory inspection the nature and essence of the technical disclosure of the application. The Abstract of the Disclosure is not intended to be limiting as to the scope of the invention in any way.

What is claimed is:

1. A pallet device for storing goods comprising:

a planar surface having a top and a bottom;

at least two foldable cross braces for securing to said bottom of said planar surface, said cross braces each having a length and a width, each of said cross braces further having a first row of first slits extending along said length of said cross brace and a second row of second slits also extending along said length of said cross brace; and

a plurality of ribs, each of said ribs for insertion into a first slit of said first row of first slits and a second slit of said second row of second slits when said cross brace is folded,

wherein each of said cross braces further includes a third row of third slits extending along said length of said cross brace said third row of third slits are positioned in alternating relationship with said first row of first slits.

2. The pallet device of claim **1** wherein said planar surface has openings on said top for securing goods to said pallet device.

3. The pallet device of claim **1** wherein said cross braces include die cuts extending along said length, said cross braces are foldable along said die cuts.

4. The pallet device of claim**1** wherein said third row of third slits are positioned in alternating relationship within said first row of first slits, said third row of third slits having a width smaller than a width of said first row of first slits.

5. The pallet device of claim **1** wherein each of said cross braces further includes a fourth row of fourth slits extending along said length of said cross brace, said fourth row of fourth slits are positioned in alternating relationship with said second row of second slits.

6. The pallet device of claim **5** wherein said first slits are in line with said second slits along the width of said cross brace and said third slits are in line with said fourth slits along the width of said cross brace.

7. The pallet device of claim **6** wherein the distance between said first slits and said second slits along the width of said cross brace is greater than the distance between said third slits and said fourth slits along the width of said cross brace.

8. The pallet device of claim **7** wherein said plurality of ribs include first ribs and second ribs, each of said first ribs for insertion into a first slit of said first row of first slits and a second slit of said second row of second slits when said cross brace is folded, each of said second ribs for insertion into a third slit of said third row of third slits and a fourth slit of said fourth row of fourth slits when said cross brace is folded.

9. The pallet device of claim **8** wherein said first ribs have a depth greater than said second ribs.

10. The pallet device of claim **5** wherein said fourth row of fourth slits are positioned in alternating relationship within said second row of second slits, said fourth row of fourth slits having a width smaller than a width of said second row of second slits.

11. The pallet device of claim **1** wherein said ribs each include slots.

12. A pallet device for storing goods comprising:

a planar surface having a top and a bottom;

at least two cross braces, said cross braces each having a length, a width, and a depth, each of said cross braces further having an upper surface, a lower surface, two sides, and a partition all extending along the length of said cross brace and forming two openings extending along the length of said cross brace, wherein said openings are positioned adjacent to each other along the width of said cross brace and separated by said partition, said partition includes a first row of first slits wherein each first slit extends along the depth of said cross brace but not the entire depth of said cross brace, said lower surface includes a second row of second slits wherein each second slit extends along the width of said cross brace, said upper surface of said cross brace for securing to said bottom of said planar surface; and

a plurality of ribs each comprising a partial third slit, each of said ribs for insertion into a first slit of said first row of first slits of said partition and a second slit of said second row of second slits of said lower surface, wherein when said ribs are fully inserted into said partition, said third slit of each of said ribs is positioned above a respective said first slit of said partition of said cross brace.

13. The pallet device of claim **12** wherein said planar surface has opening on said top for securing goods to said pallet device.

14. The pallet device of claim **12** wherein said plurality of ribs are inserted into said cross braces at said first and second slits.

15. The pallet device of claim **14** wherein said ribs block said openings extending along the length of said cross braces.

16. The pallet device of claim **14** wherein the upper surfaces of said at least two cross braces are secured to said bottom of said planar surface.

17. The pallet device of claim **16** wherein said cross braces are secured to said planar surface by adhesive material.

18. The pallet device of claim **16** wherein three cross braces are secured to said bottom of said planar surface in parallel relationship, wherein a first cross brace is positioned at a first end of said planar surface, a second cross brace is positioned at an opposing second end of said planar surface, and a third cross brace is positioned along a centerline of said planar surface.

19. The pallet device of claim **18** wherein said cross braces have spaces therebetween.

20. The pallet device of claim **12** wherein said depth of said cross brace includes a first depth and a second depth and said lower surface of said cross brace includes a first lower surface and a second lower surface, wherein said first lower surface is positioned at said first depth and said second lower surface is positioned at said second depth, said first depth is greater than said second depth.

21. The pallet device of claim **20** wherein each of said cross braces include at least three first lower surfaces along said length of said cross brace and at least two second lower surfaces along said length of said cross brace, said first lower surface and said second lower surfaces alternate along said length of said cross brace.

22. The pallet device of claim **20** wherein said plurality of ribs includes first ribs having a third depth and second ribs having a fourth depth, said third depth is greater than said fourth depth, said first ribs for insertion in said first and second slits at said first lower surface of said cross brace and said second ribs for insertion in said first and second slits at said second lower surface of said cross brace.

23. The pallet device of claim **22** wherein said first and second ribs are inserted in said first and second slits of said cross braces and the upper surfaces of said at least two cross braces are secured to said bottom of said planar surface.

24. A cross brace for use with a pallet device, said cross brace comprising:

an upper surface, a first lower surface, a second lower surface, two sides, and a partition all extending along an entire length of said cross brace and forming two openings extending along said length of said cross brace;

said openings are positioned adjacent to each other along a width of said cross brace and separated by said partition;

said first lower surface is positioned at a first depth of said cross brace and said second lower surface is positioned at a second depth of said cross brace wherein said first depth is greater than said second depth;

said partition includes a first row of first slits;

said first and second lower surfaces includes a second row of second slits wherein each second slit extends along the width of said cross brace and are perpendicular to said first slits of said partition;

wherein said cross brace includes at least three first lower surfaces along said length of said cross brace and at least two second lower surfaces along said length of said cross brace, said first lower surface and said second lower surface alternate along said length of said cross brace.

25. The cross brace of claim **24** further comprising a plurality of first ribs, each of said first ribs positioned within a first slit of said partition and a second slit of said first lower surface.

26. The cross brace of claim **25** further comprising a plurality of second ribs, each of said second ribs positioned within a first lit of said partition and a second slit of said second lower surface.

27. The cross brace of claim **26** wherein said first ribs have a third depth and said second ribs have a fourth depth, said third depth is greater than said fourth depth.

28. The cross brace of claim **27** wherein said first ribs each comprise a first slot, said first slot in line with said first slit of said partition.

29. The cross brace of claim **28** wherein said second ribs each comprise a second slot, said second slot in line with said first slit of said partition.

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